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EXAMINER

FOWLKES, ANDRE R

| ART UNIT | PAPER NUMBER |
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2192

DATE MAILED: 05/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|-------------------------------|--------------------------------|--|
| Office Action Summary | Application No. 09/997,056 | Applicant(s) CHAIKEN ET AL. | |
| | Examiner Andre R. Fowlkes | Art Unit 2192 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 January 2005.
 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
 5) ☐ Claim(s) _____ is/are allowed.
 6) ☒ Claim(s) 1-20 is/are rejected.
 7) ☐ Claim(s) _____ is/are objected to.
 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
 * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

1. This action is in response to the amendment filed 1/7/05.

Specification

2. The objection to the disclosure is withdrawn, in view of applicant's amendment.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Meier, U.S. Patent No. 5,802,371.

As per claim 1, Meier discloses a **computer system for generating metadata for use during stack unwinding** (col. 2:27-47, "When displaying the caller stack of a distributed client/server program that uses Remote Procedure Calls (RPC), the user is provided the capability of viewing the RPC calls in the same manner as normal procedure calls. For example, when a breakpoint is encountered in an RPC server program while using a debugger for distributed programs, the call stacks for the client and server program (comprise the modified program) are appended together into a

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single distributed call stack... The distributed call stack may span many programs, threads of execution, and computing machines... The distributed call stack may be used to select a routine from the call stack when setting a context for a tool that displays program state information (i.e. metadata for use during stack unwinding). For example, when the user selects a particular routine from the distributed call stack, the source listing, variables that are currently in scope, and thread executing the routine may be shown (i.e. metadata for the modified program, for use during stack unwinding is generated)'), **comprising:**

- **a plurality of procedures wherein each procedure comprises a sequence of binary instructions** (col. 2:34, "client ... program (i.e. procedures comprising a sequence of binary instructions)'),

- **a first plurality of blocks of metadata wherein each block of metadata is associated with a corresponding procedure in the plurality of procedures** (col. 2:43-46, "when the user selects a particular routine (i.e. procedure) from the distributed call stack, the source listing, variables that are currently in scope, and thread executing the routine may be shown (i.e. a first plurality of metadata associated with the corresponding procedure)'),

- **an unwind rewriter programmed to generate a second plurality of blocks of metadata from the first plurality of blocks of metadata in response to a modification of the sequence of binary instructions within a procedure, such that the second plurality of blocks of metadata accurately represents the modified sequence of binary instructions** (col. 2:43-46, "when the user selects a particular

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routine (i.e. modified sequence of binary instructions, consisting of interlaced/nested instructions called by the client and server machines) from the distributed call stack, the source listing, variables that are currently in scope, and thread executing the routine may be shown (i.e. a second plurality of metadata representing the modified sequence of binary instructions”).

As per claim 2, the rejection of claim 1 is incorporated and further, Meier discloses that **each block of metadata in the plurality of blocks of metadata includes at least one unwind table and at least one unwind information block** (col. 5:2-3, “The present invention also provides the capability of walking up this distributed call stack”, and to walk a call stack, one needs to identify the base/starting basic block of the stack and the current/end basic block stack pointer. The instant application stores this information in the unwind table. Additionally, walking a call stack involves an ordered set of actions over a contiguous region of code (i.e. the information pointed to/contained by the unwind information block)).

As per claim 3, the rejection of claim 2 is incorporated and further, Meier discloses that **the at least one unwind information block includes a region header describing a region of zero length** (col. 5:2-3, “The present invention also provides the capability of walking up this distributed call stack”, and to walk a call stack, one needs to identify the base/region header of the stack and the current/end basic block stack pointer.”).

As per claims 4 & 5, this is a computer implemented method version of the claimed system discussed above, in claims 1 & 2, wherein all claimed limitations have also been addressed and/or cited as set forth above. For example, see Meier's method of walking-up a call stack for a client/server program (col. 2:27-3:10). And, Meier discloses "storing (i.e. writing) the call relation (i.e. unwind data) between two parallel processing applications", at col. 1:49-51.

As per claim 6, the rejection of claim 5 is incorporated and further, Meier discloses that **parsing the original unwind data comprises identifying a start basic block and an end basic block of a region associated with the modified binary procedure** (col. 2:50, "walking up a call stack", and to walk a stack, one needs to identify the base/starting basic block of the stack and the current/end basic block stack pointer).

As per claim 7, the rejection of claim 6 is incorporated and further, Meier discloses that **identifying the end basic block of the region further comprises splitting a single basic block into two basic blocks, such that a first basic block ends on a last instruction of the region** (col. 2:50, "walking up a call stack", and when the current stack pointer resides in the middle of a basic block, that location is identified as the end of the call stack, for the purposes of a stack walk).

As per claim 8, the rejection of claim 6 is incorporated and further, Meier discloses that **parsing the original unwind data further comprises identifying an unwind information block associated with a basic block in the original order of the basic blocks that includes a when action description record and establishing a link between the when action description record and the corresponding instruction in the basic block** (col. 2:50, "walking up a call stack", and walking the stack involves determining the information stored by the when action description record).

As per claim 9, the rejection of claim is incorporated and further, Meier discloses that **regenerating new unwind data comprises regenerating new unwind tables and new unwind descriptor records** (col. 5:2-3, "The present invention also provides the capability of walking up this distributed call stack", and to walk a call stack, one needs to identify the base/starting basic block of the stack and the current/end basic block stack pointer. The instant application stores this information in the unwind table. Additionally, walking a call stack involves an ordered set of actions over a contiguous region of code (i.e. the information pointed to/contained by the unwind information block)).

As per claim 10, the rejection of claim is incorporated and further, Meier discloses that **regenerating the new unwind descriptor records further comprises determining if basic blocks identified in a single unwind table associated with the**

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original order of basic blocks are associated with more than one unwind table associated with the current order of basic blocks, and if so, creating a new region header describing a region of zero length (col. 5:2-3, "The present invention also provides the capability of walking up this distributed call stack", and to walk a call stack, one needs to identify the base/starting basic block of the stack and the current/end basic block stack pointer. The instant application stores this information in the unwind table. Additionally, walking a call stack involves an ordered set of actions over a contiguous region of code (i.e. the information pointed to/contained by the unwind information block)).

As per claims 11-14, these are a computer implemented method version of the claimed system discussed above, in claims 6-10 , wherein all claimed limitations have also been addressed and/or cited as set forth above. For example, see Meier's method of walking-up a call stack for a client/server program (col. 2:27-3:10).

As per claims 15-20 these are computer readable medium versions of the claimed system discussed above, in claims 1-3 and 6, wherein all claimed limitations have also been addressed and/or cited as set forth above. For example, see Meier's method of walking-up a call stack for a client/server program (col. 2:27-3:10).

Response to Arguments

5. Applicants arguments have been considered but they are not persuasive.

In the remarks, the applicant has argued substantially that:

- 1) Meier does not teach or otherwise address procedures at the binary level, at p. 9:4-5.

Examiner's response:

- 1) Meier does address procedures at the binary level at col. 5:30-31. Meier discloses the "first executable statement (i.e. a binary statement)" and the execution of a C program called, "calca_manager.c". C procedures are executed at the binary level.

In the remarks, the applicant has argued substantially that:

- 2) Meier does not teach an unwind rewriter programmed to generate a second plurality of blocks of metadata ... in response to a modification of the sequence of binary instructions within a procedure, at p. 9:22-24.

Examiner's response:

- 2) The examiner disagrees with applicant's characterization of the applied art. Meier teaches an unwind rewriter programmed to generate a second plurality of blocks of metadata ... in response to a modification of the sequence of binary instructions within a procedure at col. 2:27-47. Further, Meier discloses a method of displaying the call relations (i.e. unwind metadata) of a distributed program in the same manner as those of a non-distributed program. In this case, Meier's generation of unwind data is in

response to the modification of the sequence of instructions in a procedure (i.e. the combination of multiple procedures of a distributed program).

In the remarks, the applicant has argued substantially that:

3) Meier does not teach regenerating new unwind data ... that represents the current order of basic clocks within the modified binary procedure and writing the new unwind data to the modified binary procedure, at p. 9:24-26.

Examiner's response:

3) The examiner disagrees with applicant's characterization of the applied art. Meier teaches regenerating new unwind data ... that represents the current order of basic clocks within the modified binary procedure and writing the new unwind data to the modified binary procedure, at col. 2:27-3:10. Further, Meier discloses a method of displaying the call relations (i.e. unwind metadata) of a distributed program in the same manner as those of a non-distributed program. In this case, Meier's generation of unwind data is in response to the modification of the sequence of instructions in a procedure (i.e. the combination of multiple procedures of a distributed program) and reflects the current order of merged distributed procedures. Meier discloses "stor(ing) (i.e. writing) the call relation between two parallel processing applications", at col. 1:49-51.

In the remarks, the applicant has argued substantially that:

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4) Meier does not teach generating a second group of unwind data comprising a second unwind table and a second plurality of unwind descriptor records such that the second group of unwind data accurately represents the binary modification to the procedure, at p. 9:27-29.

Examiner's response:

4) The examiner disagrees with applicant's characterization of the applied art. Meier teaches generating a second group of unwind data comprising a second unwind table and a second plurality of unwind descriptor records such that the second group of unwind data accurately represents the binary modification to the procedure, at col. 2:27-3:10. Further, Meier discloses a method of displaying the call relations (i.e. unwind metadata) of a distributed program in the same manner as those of a non-distributed program. In this case, Meier's generation of a second group of unwind data is in response to the modification of the sequence of instructions in a procedure (i.e. the combination of multiple procedures of a distributed program) that accurately represents the modified procedure.

In the remarks, the applicant has argued substantially that:

5) Meier does not teach that the first metadata field and the second metadata field accurately reflect a flow of instructions of the basic blocks in the second order, at p. 9:31-32.

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Examiner's response:

5) The examiner disagrees with applicant's characterization of the applied art.

Meier teaches that the first metadata field and the second metadata field accurately reflect a flow of instructions of the basic blocks in the second order, at col. 2:27-3:10.

Further, Meier discloses a method of displaying the call relations (i.e. unwind metadata) of a distributed program in the same manner as those of a non-distributed program. In this case, Meier's generation of a second group of unwind data is in response to the modification of the sequence of instructions in a procedure (i.e. the combination of multiple procedures of a distributed program) that accurately represents the modified procedure.

In the remarks, the applicant has argued substantially that:

6) Meier does not teach generating a second group of unwind data ... such that the second group of unwind data accurately represents the binary modification to the procedure, at p. 9:33-10:2.

Examiner's response:

6) The examiner disagrees with applicant's characterization of the applied art.

Meier teaches generating a second group of unwind data ... such that the second group of unwind data accurately represents the binary modification to the procedure, at col. 2:27-3:10. Further, Meier discloses a method of displaying the call relations (i.e. unwind metadata) of a distributed program in the same manner as those of a non-distributed

program. In this case, Meier's generation of a second group of unwind data is in response to the modification of the sequence of instructions in a procedure (i.e. the combination of multiple procedures of a distributed program) that accurately represents the modified procedure.

In the remarks, the applicant has argued substantially that:

7) Meier does not teach regenerating new unwind data ... that represents the current order of basic block within the modified binary procedure and writing the new unwind data to the modified binary procedure, at p. 10:2-4.

Examiner's response:

7) The examiner disagrees with applicant's characterization of the applied art. Meier teaches regenerating new unwind data ... that represents the current order of basic block within the modified binary procedure and writing the new unwind data to the modified binary procedure, at col. 2:27-3:10. Further, Meier discloses a method of displaying the call relations (i.e. unwind metadata) of a distributed program in the same manner as those of a non-distributed program. In this case, Meier's generation of a second group of unwind data is in response to the modification of the sequence of instructions in a procedure (i.e. the combination of multiple procedures of a distributed program) that accurately represents the modified procedure. Meier continues to disclose "stor(ing) (i.e. writing) the call relation between two parallel processing applications", at col. 1:49-51.

Conclusion

6. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

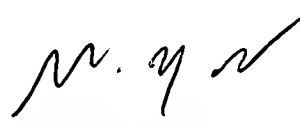
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andre R. Fowlkes whose telephone number is (571) 272-3697. The examiner can normally be reached on Monday - Friday, 8:00am-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tuan Q. Dam can be reached on (571)272-3695. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ARF



WEI Y. ZHEN
PRIMARY EXAMINER